Baroid

AQUAGEL GOLD SEAL®

Viscosifier — **Product Data Sheet**

Product Description

AQUAGEL GOLD SEAL, sodium montmorillonite, is a premium Wyoming bentonite that contains no polymer additives or chemical treatments of any kind. It meets API Specification 13A, Sections 5. AQUAGEL GOLD SEAL acts as a viscosifier and filtrate reducer for drilling fluids.

Application/Functions

- Viscosify anionic water-based drilling fluids
- Reduce water seepage or filtration into permeable formations
- Form a thin filter cake with low permeability
- Promote hole stability in poorly consolidated formations

Advantages

- Provides suspension for fluids weighted with barite or hematite
- Improves hole-cleaning capacity of drilling fluids
- Contains no polymer or chemical additives
- Is environmentally responsible
- Can be added directly to fresh water or fresh water drilling fluids
- Can be supplemented with polymeric extenders

Typical Properties

• Appearance	Variable-colored powder
• Bulk density, compacted	73 lb/ft³
Bulk density, uncompacted	50 lb/ft³
Bulk density, compacted	1169 kg/m³
Bulk density, uncompacted	800 kg/m³

Recommended Treatment

Add AQUAGEL GOLD SEAL in concentrations of 5-25 lb/bbl (14-70 kg/m³) slowly through a jet mixer or sift slowly into the vortex of a high speed stirrer.
Note: For optimum yield, AQUAGEL GOLD SEAL should be prehydrated in fresh water when chlorides exceed 8000 ppm.

Packaging

AQUAGEL GOLD SEAL is available in 50-lb (22.7-kg) and 100-lb (45.4-kg) sacks.

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CFR-2

Cement Friction Reducer

CFR-2 (red label, blue label, or liquid) is a cement friction-reducing additive that helps reduce the apparent viscosity and rheological properties of a cement slurry.

APPLICATIONS

CFR-2 friction reducer is designed for wells with bottomhole circulating temperatures (BHCTs) higher than 60°F (16°C). Because this additive helps improve the slurry's rheological properties, friction pressures are reduced during pumping. Consequently, turbulent flow can be achieved at lower pumping rates.

FEATURES

CFR-2 friction reducer is available in powder or liquid form. Both forms help improve fluid-loss control to a certain extent and normally provide slight cement retardation.

COMPATIBILITIES

Both the liquid and powder forms of CFR-2 friction reducer help increase the apparent viscosity of slurries containing certain low fluid-loss materials (especially Halad®-9 additive and Halad®-22AL additive).

CFR-2 Cement Additive (Red Label)—Product Specifications

SAP No.	100012762	**Bulk Density**	40.30 lb/ft^3
Form	Solid, tan powder	**pH**	9.4
Specific Gravity	1.16	**Packaging**	50-lb bag

CFR-2 Cement Additive (Blue Label)—Product Specifications

SAP No.	100001597	**Bulk Density**	40.30 lb/ft^3
Form	Solid, tan powder	**pH**	9.4
Specific Gravity	1.300	**Packaging**	50-lb bag

CFR-2L Cement Additive—Product Specifications

SAP No.	100023187	**Boiling Point**	218°F (103°C)
Form	Dark-amber liquid	**Flash Point**	210°F (98°C)
Specific Gravity	1.160	**pH**	9.4
Bulk Density	9.66 lb/gal	**Packaging**	5-gal can

CFR-3 Cement Friction Reducer

Dispersant

Halliburton CFR-3 friction reducer helps reduce the apparent viscosity and improve the rheological properties of a cement slurry. As a result, turbulent flow can be achieved at lower pumping rates, which results in reduced friction pressure during pumping.

When a slurry's apparent viscosity is reduced, the slurry can be mixed at a higher density by reductions in the amount of mix water added. Although the slurry is denser, it remains easy to pump and will require less (possibly no) weighting material.

CFR-3 friction reducer also improves fluid-loss control and provides slight slurry retardation.

FEATURES

CFR-3 friction reducers are available with or without defoamer. When defoamer is used, the mixing concentration is 0.3 to 1.5%. Without defoamer, the mixing concentration is 0.3 to 1.0%. Both products can be applied in wells above 60°F (16°C), in all API cement classes.

BENEFITS

CFR-3 friction reducers provide the following benefits:

- reduced hydraulic horsepower requirements
- greater turbulence at lower pump rates

CFR-3 Cement Friction Reducer (with Defoamer)—Product Specifications

SAP No.	100012206	**Bulk Density**	38.00 lb/ft^3
Form	dark red powder	**Packaging**	50-lb bag
Specific Gravity	1.28		

CFR-3 Cement Friction Reducer (without Defoamer)—Product Specifications

SAP No.	100003653	**Bulk Density**	38.00 lb/ft^3
Form	reddish-brown solid, powder	**pH**	7 to 9
		Packaging	50-lb bag
Specific Gravity	1.28		

D-Air 2

Anti-Foam Agent

When added to mixing water, D-Air 2 anti-foam agent minimizes foaming and air entrainment in cement slurries. When entrained air is reduced, slurries can be mixed closer to the recommended density.

FEATURES

D-Air 2 anti-foam agent is a clear, colorless liquid packaged in 5-gal pails. It is usually used at temperatures between 60° and 400°F (16° to 204°C) at concentrations between 0.02 to 0.3 gal/sk cement.

BENEFITS

D-Air 2 anti-foam agent has the following benefits:

- It helps reduce air entrainment.
- It can allow slurries to be mixed closer to recommended densities.

D-Air 2 Anti-Foam Agent—Product Specifications

Part No.	70.15767	**Bulk Density**	8.41 lb/gal
Form	clear, colorless liquid	**Packaging**	5-gal pail
Specific Gravity	1.010 lb/gal	**Pour Point**	-35°F(-37°C)
Flash Point	> 300°F(> 140°C)		

Halad®-344

Fluid-Loss Additive

Halad®-344 fluid-loss additive is especially useful in lightweight cementing compositions that often have long thickening times. The material is nonretarding, thus making good compressive strength development possible at low temperatures. Halad®-344 additive performs as well in seawater as in fresh water, and is compatible with retarders, dispersants, and calcium chloride ($CaCl_2$).

Features

Halad®-344 additive has no temperature limitations. Laboratory testing has shown that it is effective at 400°F or higher. Other features can include the following:

- Excellent fluid-loss control is available with very low concentrations of Halad®-344 additive.
- Halad®-344 additive is relatively salt-tolerant, which can make it effective with up to 18% salt in a variety of cement compositions.

Benefits

Halad®-344 additive can provide the following benefits associated with low fluid loss in squeeze-cementing and primary cementing jobs.

Squeeze Cementing. In squeeze-cementing jobs, Halad®-344 additive offers the following advantages:

- It helps reduce premature dehydration in tubing and casing while squeezing perforations.
- Long perforated intervals can often be successfully squeezed in a single stage.
- Satisfactory squeeze results can be obtained at low pressures without overdisplacement.
- The additive helps protect water-sensitive shale sections that may weaken and break down because of cement filtrate.
- Halad®-344 additive helps reduce the amount of filtrate that can penetrate formations containing bentonite clays.

Halad®-344 Additive—Product Specifications

Part No.	516.00227	**Bulk Density**	26.00 lb/ft^3
Form	white to off-white solid powder	**Packaging**	50-lb sack
Specific Gravity	1.220		

Halad®-413

Fluid-Loss Additive

Halad®-413 fluid-loss additive can provide excellent fluid-loss control in high-temperature wells, especially when used on densified cement slurries or slurries mixed with high salt concentrations. Cement slurries that have traditionally exhibited surface mixing difficulty have responded especially well to Halad®-413 additive because it does not viscosify the slurry.

FEATURES

Halad®-413 additive has a broad application range. For a variety of cement compositions, fluid-loss values can be obtained over a wide temperature range, from 180° to 400°F. Even above 400°F, Halad®-413 additive does not tend to increase viscosity. Other features include the following:

- In many cases, cement slurries mixed with Halad®-413 additive do not require the addition of dispersants; they can be mixed with strength-stabilizing agents without an increase in the slurry viscosity.
- Halad®-413 additive can enhance densified cement designs because it allows heavyweight slurries to be mixed at lower surface viscosities.

BENEFITS

Halad®-413 additive helps provide the following benefits associated with low fluid loss in squeeze-cementing and primary cementing jobs.

Squeeze Cementing. In squeeze-cementing jobs, Halad®-413 additive can offer the following advantages:

- It helps reduce premature dehydration in tubing and casing while perforations are squeezed.
- Long perforated intervals can often be successfully squeezed in a single stage.
- Satisfactory squeeze results can be obtained at low pressures without overdisplacement.

Halad®-413 Additive—Product Specifications

Part No.	516.00512	**pH**	7.5
Form	Brown/black solid, powder	**Packaging**	50-lb bag
Specific Gravity	1.48	**Bulk Density**	42.00 lb/ft^3

HR®-5

Cement Additive

HR®-5 additive is a chemically modified lignosulfonate that retards the setting of cement. It is designed for use in wells with circulating temperatures between 125° and 206°F (290°F static).

FEATURES

HR®-5 additive is compatible with the following:

- fresh or saltwater slurries
- most cement additives
- all API cements
- bentonite cement
- Pozmix® A cement

BENEFITS

HR®-5 additive provides the following benefits:

- Increased concentrations of HR®-5 additive enhance the predictability of cement thickening times.
- HR®-5 additive decreases the danger of over-retarded slurries at the top of a long cement column.
- HR®-5 additive provides early cement-strength development.
- Operators can use HR®-5 additive to help displace slurries at high rates while maintaining formation pressure.

HR®-5 Additive—Product Specifications

SAP No.	100005050	**Bulk Density**	38 lb/ft^3
Form	Black, solid powder	**Packaging**	50-lb bag
Specific Gravity	1.41		

HR®-7

Cement Retarder

HR®-7 retarder is a sodium lignosulfonate that can be used as a retarder and dispersant in all API classes of cement as well as Pozmix® cement.

Applications

HR®-7 retarder can be used in wells with bottomhole circulating temperatures (BHCTs) between 110° and 170°F (43° and 77°C). This retarder's dispersing capabilities are particularly useful in cements containing high gel percentages. In these slurries, HR®-7 retarder decreases air entrainment. It can also be used to help control fluid loss in slurries that are subjected to high shear rates.

Benefits

Small amounts of HR®-7 retarder can extend a slurry's temperature range and yield a smoother, more uniform slurry. In addition, HR®-7 retarder can provide the following benefits:

- extended pumping times
- early cement-strength development
- more predictable thickening times
- improved slurry displacement rates at steady pressures

HR®-7 Retarder—Product Specifications

Part No.	890.50903	**Bulk Density**	38.00 lb/ft^3
Form	Solid, black powder	**Packaging**	50-lb bag
Specific Gravity	1.410		

MICROSAND

Cement Additive

MICROSAND cement additive is a high-purity crystalline silica ground to a uniform particle-size distribution of 5 microns.

APPLICATIONS

MICROSAND additive was developed for use with Matrix™ and Micro Matrix cements. MICROSAND additive can help prevent compressive-strength retrogression in high-temperature applications. It can also help cement slurry penetrate previously inaccessible areas.

COMPATIBILITIES

MICROSAND cement additive is incompatible with hydrogen fluoride and hydrochloric acid.

BENEFITS

MICROSAND additive provides the following benefits:

- It helps control settling and gelation.
- It can allow penetration into the formation matrix.

MICROSAND Additive—Product Specifications

Part No.	516.00614	**Bulk Density**	38.00 lb/ft^3
Form	White or tan, solid powder	**Packaging**	50-lb bag
Specific Gravity	2.650	**Flash Point**	None

SSA-1

Strength-Stabilizing Agent

SSA-1 agent (also called silica flour) is a powdered sand that helps oilwell cement maintain low permeability and high compressive strength under high-temperature conditions.

APPLICATIONS

SSA-1 agent is recommended for use in cementing wells where static temperatures exceed 230°F. Above this temperature, most cement compositions exhibit satisfactory compressive strength after the initial set but will rapidly lose strength after continued exposure to high temperatures. SSA-1 agent helps prevent this problem by chemically reacting with the cement at high temperatures. SSA-1 agent has been widely used in thermal recovery wells in combination with refractory-type cements.

FEATURES

SSA-1 agent is mined and processed in the following two forms:

- in a minus 200-mesh powder for maximum reactivity in cement concentrations of normal weight
- in a selected particle-gradation design for densified cements where increased weights and maximum reactivity are required

BENEFITS

The greatest benefit of SSA-1 agent is its compatibility with various cementing materials and additives. SSA-1 agent is compatible with all cements as well as all commonly used retarders, friction reducers, low water-loss additives, and weighting and lost-circulation materials.

SSA-1 Agent —Product Specifications

Part No.	890.51039	**Bulk Density**	70.00 lb/ft^3
Form	White, solid powder	**Packaging**	100-lb sack
Specfic Gravity	2.630		

SSA-2

Coarse Silica Flour

SSA-2 coarse silica flour is Oklahoma No. 1 dry sand.

APPLICATIONS

SSA-2 silica is coarser grind than SSA-1 silica. It helps stabilize the strength and permeability of cement at bottomhole temperatures (BHTs) between 230° and 700°F (110° and 371°C). Typical concentrations are 35 to 100% by weight of cement (bwoc).

BENEFITS

SSA-2 course silica flour can provide the following benefits:

- It helps prevent strength retrogression and can decrease permeability in cement systems.
- It is compatible with all types of cement.
- SSA-2 coarse silica flour has no secondary effects on the cement slurry.

SSA-2 Coarse Silica Flour—Product Specifications

Part No. (100-lb sk)	70.43106 (100002158 SAP)	**Specific Gravity**	2.650
		Bulk Density	100 lb/ft^3
Form	White to brown, solid granules		

Baroid

BARAZAN® PLUS

Viscosifier/Suspension Agent — Product Data Sheet

Product Description

BARAZAN PLUS, a powdered, biopolymer (xanthan gum); provides viscosity and suspension in fresh water, sea water, sodium bromide, potassium bromide, potassium chloride, and sodium chloride-based fluids.

Applications/Functions

- Viscosify fresh water and brine-based fluids used in drilling, milling, underreaming, and gravel packing operations
- Suspend bridging agents and weighting materials in fresh water and brine systems

Advantages

- Disperses easily in fresh water or brine with shear
- Provides thixotropic properties and non-Newtonian flow characteristics over a wide salinity range at low concentrations
- Provides excellent suspension without the need of additional clays
- Minimizes the potential for formation damage
- Stable to 250°F (121°C)

Typical Properties

• Appearance	Yellow to white powder
• pH, (1% aqueous solution)	6.3
• Specific gravity	1.6

Recommended Treatment

Mix 0.1-2 lb/bbl of BARAZAN PLUS (0.3-5.7 kg/m³), or as needed to obtain the desired viscosity and suspension characteristics.

Packaging

BARAZAN PLUS is packaged in 25-lb (11.3-kg) sacks.

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EZ-MUD®

Shale Stabilizer — Product Data Sheet

Product Description

EZ-MUD, partially hydrolyzed polyacrylamide / polyacrylate (PHPA) copolymer emulsion, is used to stabilize reactive clay and shale formations. EZ-MUD acts as a shale stabilizer by adsorbing onto cuttings and clays on the borehole wall, preventing dispersion. Because of its high molecular weight, EZ-MUD quickly viscosifies with increased concentrations. EZ-MUD is readily soluble in fresh, brackish, or salt waters, and it can be used to prepare solids-free drilling fluids.

Applications / Functions

- Stabilize water-sensitive formations
- Reduce bit-balling
- Increase rheological properties of drilling fluids
- Provide mud lubricity in low pressure situations
- Flocculate drilled solids when used in low concentrations
- Enhance the yield of bentonite clays in low solids drilling systems

Advantages

- Yields rapidly with minimum shear
- Is nonfermenting
- Does not require biocides
- Stable in monovalent salt (NaCl, KCl, etc.) environments
- Effective in small concentrations
- Can be destroyed with oxidizing agents when desired

Typical Properties

• Appearance	Milky-white fluid with minimal syneresis
• Flash point, PMCC >	200 °F 93 °C
• Specific gravity	1.05

Recommended Treatment

Add 1-4 lb/bbl (2.9-11.4 kg/m³) of EZ-MUD slowly through the hopper.
Note: If product has separated due to extended storage, resuspend by shaking vigorously or rolling containers before using

Packaging

EZ-MUD is packaged in 5-gal (18.9-l) and 1-gal (3.8-l) pails.

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Baroid

INVERMUL®

Emulsifier — Product Data Sheet

Product Description

INVERMUL, a blend of oxidized tall oil and polyaminated fatty acid, is the basic ingredient of Baroid's water-in-diesel oil emulsion drilling fluids. INVERMUL stabilizes emulsion, aids suspension properties, and reduces filtration. INVERMUL is used with lime to produce a calcium soap emulsifier in-situ.

Application Functions

- Form stable water-in-oil emulsions
- Lower filtration rates
- Impart high temperature stability to oil-based fluids

Advantages

- Can be added directly to the system
- Resists electrolyte contamination

Typical Properties

• Appearance	Dark liquid
• Flash point, SETA	156 °F 69 °C
• Specific gravity	0.94

Recommended Treatment

1. For normal applications, add 4-12 lb/bbl (11.41-34.24 kg/m³).
2. For high temperatures (>350°F) (>177°C), add 10-25 lb/bbl (28.53-71.33 kg/m³).
3. For relaxed-filtrate systems, add 0.25-4.0 lb/bbl (0.71-11.41 kg/m³).

Note: For every pound of INVERMUL that is added to the system, add 0.5 lb/bbl (1.4 kg/m³) of lime.

Packaging

INVERMUL is packed in 55-gal (208-l) drums and in bulk.

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Baroid

EZ MUL®

Emulsifier — Product Data Sheet

Product Description

EZ MUL, polyaminated fatty acid, can be used to emulsify water into oil in diesel oil-based drilling fluids. It is used to improve a drilling fluid's oil-wetting characteristics and is designed for use in oil-based fluids that contain high levels of divalent salts (i.e. $CaCl_2$, $MgCl_2$) in the fluid's water phase. EZ MUL is the primary emulsifier in the INVERMUL® RF systems. When EZ MUL is used with INVERMUL, it aids in producing a stable invert emulsion system with low filtration rates.

Application Functions

- Prepare INVERMUL RF systems
- Promote oil-wetting in invert emulsion systems
- Improve electrical stability measurements
- Reduce flow properties of invert emulsions

Advantages

- Effective at low concentrations
- Can be added directly to the system
- Thermally stable at temperatures greater than 500°F (260°C)
- Compatible with other oil-based mud additives

Typical Properties

• Appearance	Thick dark liquid
• Flash point, PMCC	178 °F 81 °C
• Specific gravity	0.95

Recommended Treatment

1. For INVERMUL RF systems, add 4-12 lb/bbl (11.4-34.2 kg/m³) directly to the system.
2. For an INVERMUL system, add 2-6 lb/bbl (5.7-17.1 kg/m³) directly to the system.

Packaging

EZ MUL is packaged in 55-gal (208-l) drums and in bulk.

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Baroid

EZ MUL® NTE

Emulsifier — **Product Data Sheet**

Product Description

EZ MUL NTE, a polyaminated tall oil in an ester carrier fluid, is a liquid additive specifically designed for the PETROFREE® biodegradable ester-based invert emulsion system. It is the primary emulsifier in PETROFREE systems. EZ MUL NTE can also be used to condition most oil-based drilling fluids and to improve oil-wetting characteristics. EZ MUL NTE is stable in oil-based invert emulsion systems containing high levels of divalent salts (i.e. $CaCl_2$, $MgCl_2$) in the fluid's water phase.

Application Functions

- Promote oil-wetting in the PETROFREE invert emulsion systems
- Promote oil-wetting in invert emulsion systems
- Improve electrical stability
- Reduce flow properties of invert emulsions

Advantages

- Effective in small concentrations
- Can be added directly to the system
- Stable at temperatures greater than 500°F (260°C)
- Compatible with other oil-based mud additives

Typical Properties

• Appearance	Thick red-amber liquid
• Flash point, PMCC >	200 °F 93 °C
• Specific gravity	0.93

Recommended Treatment

Add 4-20 lb/bbl (11.4-57.1 kg/m³) of EZ MUL NTE directly to the system.

Packaging

EZ MUL NTE is packaged in 52-gal (198-l) drums containing 427-lb (194-kg) net weight.

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GELTONE® II

Viscosifier — **Product Data Sheet**

Product Description

GELTONE II, organophilic clay, imparts viscosity and suspension properties to oil-based drilling fluids. GELTONE II is a bentonite clay that has been treated with an amine compound to promote its dispersion/yield in oils. GELTONE II was developed to build suspension and cuttings transport capability into oil muds in less time and at lower shear rates and lower temperatures.

Applications/ Functions

- Viscosify any oil-based drilling fluid
- Improve hole cleaning during drilling and workover operations
- Gel oil muds for long-term suspension of weighting agents in packer fluids and casing packs

Advantages

- Stable at temperatures approaching 350°F (177°C)
- Aids in filtration control

Typical Properties

• Appearance	Gray-tan powder
• Specific gravity	1.7

Recommended Treatment

Add 2-15 lb/bbl (5.71-42.80 kg/m³) of GELTONE II slowly through the hopper.
Note: Decrease yielding time by adding a small stream of water through the hopper at the same time.

Packaging

GELTONE II is packaged in 50-lb (22.7-kg) sacks.

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Baroid

GELTONE® V

Viscosifier — Product Data Sheet

Product Description

GELTONE V, an organophilic clay, imparts viscosity and suspension properties to oil-based drilling fluids. GELTONE V is a bentonite clay that has been treated with an amine compound to promote its dispersion/yield in oils.

Applications/ Functions

- Viscosify any oil-based drilling fluid
- Improve hole cleaning during drilling and workover operations
- Gel oil muds for long-term suspension of weighting agents in packer fluids and casing packs

Advantages

- Stable at temperatures approaching 400°F (205°C)
- Aids in filtration control

Typical Properties

• Appearance	Gray-tan powder
• Specific gravity	1.6

Recommended Treatment

Add 1-15 lb/bbl (2.86-42.80 kg/m³) of GELTONE V slowly through the hopper.
Note: Decrease yielding time by adding a small stream of water through the hopper at the same time.

Packaging

GELTONE V is packaged in 50-lb (22.7-kg) sacks.

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DURATONE® HT

Filtration Control Agent — Product Data Sheet

Product Description

DURATONE HT, organophilic leonardite, is used to control filtration rates in oil based drilling muds. DURATONE HT is stable at high temperatures and it can be used to control filtration rates in deep, hot wells. It can also be used to improve emulsification of water in oil-based muds and to promote fluid stability.

Application / Functions

- Reduce HTHP filtration rate
- Promote stability of invert emulsion fluids

Advantages

- Increases thermal stability of drilling fluids at temperatures beyond 500°F (260°C)
- Effective in all oil and invert emulsion systems

Typical Properties

• Appearance	Gray to black powder
• Bulk density, compacted	44 lb/ft³
Bulk density, uncompacted	31 lb/ft³
Bulk density, compacted	705 kg/m³
Bulk density, uncompacted	497 kg/m³
• Specific gravity	1.8

Recommended Treatment

Add 2-20 lb/bbl (5.7-57.1 kg/m³) of DURATONE HT. Concentration will depend on the degree of filtration control desired.

Packaging

DURATONE HT is packaged in 50-lb (22.7-kg) sacks.

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